

Zero Retries issue 0062 2022-09-02

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Pseudosponsor - Surrey Amateur Radio Club's The Communicator

This issue of Zero Retries is pseudosponsored by the Surrey Amateur Radio Club's [The Communicator - September-October 2022](#) "newsletter". If you want to see *just how good* free Amateur Radio content can be... 134 pages of it... check out The Communicator.

Request To Send

Countdown to [Digital Communications Conference 2022](#) - September 16-18, in Charlotte, North Carolina, USA:

10 09 08 07 06 05 04 03 02 weeks...

Countdown to DCC 2022 Paper submission deadline - September 1:

(Time's up!)

It was a long four-day slog of a bit too much butt-in-chair time (painful, given Bellingham's gorgeous Summer weather thirty feet away from my desk), but I'm proud to report that I *finished* and uploaded my paper for the ARRL and TAPR Digital Communications Conference 2022 *on time* (see below). While I won't be attending DCC 2022 in person, and I don't plan to present (virtually, via video), I do plan to watch the streamed presentations and I really look forward to reading the submitted papers.

Zero Retries is entirely about technological innovation in Amateur Radio, and there's no event more closely aligned with that theme than the DCC. That's not a coincidence... Zero Retries is significantly inspired by ideas presented at the DCC. I look forward to sharing my impressions of DCC 2022 in Zero Retries 0067 (and probably Zero Retries 0068) after DCC 2022 is concluded.

...de Steve N8GNJ

My DCC 2022 Paper - A Brief Survey of Technological Innovation in Amateur Radio

I'll reserve the full text of my paper for after the start of the DCC, but here are the pretext sections.

A Brief Survey of Technological Innovation in Amateur Radio

By Steve Stroh N8GNJ¹

ARRL and TAPR 2022 Digital Communications Conference

Charlotte, North Carolina, USA 2022-09-16 thru 18

Abstract

In recent decades, the perception of Amateur Radio within the general public has shifted from Amateur Radio being useful, innovative, and an interesting technical activity, to Amateur Radio being perceived as an anachronism and largely irrelevant (except in the direst of communications emergencies). Summarized: "Ham Radio – that's still around?"

Amateur Radio's service to the public for emergency communications is being supplanted by improved commercial and government communications capabilities such as improved Iridium² satellite phones, the FirstNET³ public safety cellular system, and most recently, the nomadic capability of the Starlink⁴ broadband satellite system.

Amateur Radio has continuously developed unique technological innovations in radio technology, and that has not only continued in the modern era but has accelerated. However, that ongoing, unique contribution to technological society is, increasingly, unrecognized. That

is unfortunate. *If* regulators, lawmakers, industry, the general public... and the Amateur Radio community itself understood the unique contributions to technological innovations in radio technology that Amateur Radio continues to develop, perhaps such recognition might improve Amateur Radio's perception that it remains a valuable part of society, worthy of continued access to portions of the electromagnetic spectrum.

Keywords

Amateur, Radio, Operator, Ham, Wireless, Technology, Innovation, Spectrum, Digital, VHF, UHF, SHF, Microwave, Communications, ARDC, Techies, Makers, Hackers, Zero Retries Newsletter, Experimentation, Research and Development, FlexRadio, Steve Stroh N8GNJ

Background

For decades, I have been an admirer of technological innovation in Amateur Radio. Not just new technologies like Packet Radio emerging in the 1980s, but new techniques for old problems such as digital techniques enabling reliable communications via unreliable mediums such as the High Frequency (HF)[5](#) (aka Shortwave) portions of the electromagnetic spectrum.

Amateur Radio's unique culture, the varying characteristics of various portions of spectrum allocated to (or shared with) Amateur Radio operations, and the many highly capable and skilled Amateur Radio Operators, have resulted in a fertile, and welcoming "experimental zone" for technological innovation in radio technologies. Until recent decades, that culture of technological innovation was widely recognized, and encouraged. In the last few decades, the recognition of utility and contributions to technological innovation have been deprecated to near irrelevance... at least in popular perception... by ubiquitous Internet access, mobile phones, caricatures of Amateur Radio as "Grandpa sitting in the basement tapping on a Morse Code key", and most notably, the removal of old barriers to individuals communicating across international borders.

A primary reason that this is a concern for society is that it has become irrevocably dependent on radio technology as the primary method of communications for mobile devices, most notably cellular technology, wireless local area networks (Wi-Fi), and most recently, direct-to-user satellite communications. For many people, their mobile phone is their only method of communications and media consumption. Much of that technology has been developed and manufactured in China. Dependence on China for such a critical infrastructure function is proving to be fraught with peril. To counter that peril, the US and other Western nations must quickly develop additional expertise, and personnel, "in nation" to better develop and support this now-critical wireless infrastructure. Amateur Radio can be a "training ground" for developing familiarity and expertise with radio technology, leading to careers in developing and supporting radio technology... but only if Amateur Radio is recognized as a useful and interesting.

The rise of technology specialists, especially those trained in Information Technology (IT), the "Maker culture"[6](#), and the "Hacking Culture"[7](#) have breathed new life into Amateur Radio. "Techies" have discovered Amateur Radio as an enabling technology for supporting experimentation with Information Technologies (such as building hobbyist / not-for-profit wide- area microwave networks). Makers have discovered that there are incredibly interesting things that they can add to their personal knowledge base and practical projects based on

capabilities Amateur Radio has long taken for granted, such as long-range communications via VHF / UHF repeaters. Hackers have discovered Amateur Radio as a fertile “playground” for their experiments and expansion of knowledge about radio technology, such as Software Defined Receivers... and Transmitters (*with* an Amateur Radio license).

I started the Zero Retries Newsletter⁸ in July, 2021 out of frustration that the totality of technological innovation in Amateur Radio wasn’t being recognized by the Amateur Radio community, its regulators, and especially the public at large. Specifically, I was worried about the growing public perception that Amateur Radio is irrelevant, or worse, an anachronism. Such a perception, if it is to continue for much longer, may prove catastrophic to Amateur Radio, most notably in the loss of Amateur Radio access to various portions of spectrum. To date I’ve published more than fifty weekly issues of Zero Retries, and each issue highlights some aspect of technological innovation in Amateur Radio.

Literally, Amateur Radio is a license to experiment with radio technology and a welcoming “innovation zone” to develop new and exciting technological innovations in radio technology. I hope to make that point with the vignettes in this paper.

Again, I’ll publish the full paper (independent of the DCC publication process) after the start of the DCC.

New Era About to Dawn for Personal Satellite Communications

*This article is outside the normal topic of Amateur Radio, but I think this development is a big deal (in the making), and thus worth discussing here in Zero Retries. These developments **will** affect us in the next few years. Thus, consider this a heads up to the unique Zero Retries readership.*

On 2022-08-25, I published a “Thread” - Real Satellite Cellular Telephones in 2023.

That announcement and discussion was about a new “technology partnership” between T-Mobile and Starlink for T-Mobile subscribers, that are within the footprint of US (including territories and offshore zones), but outside the range of terrestrial cellular networks, to be able to use satellite communication for essential communications such as text messaging and “call for help” in an emergency.

The most startling thing (not) about the T-Mobile / Starlink announcement is that unlike existing “phones” for Iridium, Globalstar, and other satellite phone services, this future T-Mobile / Starlink service will not require a “satellite phone” - it will work with a current generation (manufactured within the past few years) *mobile phone*. T-Mobile will allow Starlink to use a portion of its allocated (owned) spectrum available within all borders of the US, to be used from Starlink satellites, nationwide in the US.

While it wasn’t stated overtly in the T-Mobile / Starlink announcement (other than, what I perceived as a hint - “We’re partners now...”), I strongly suspect that this announcement is a pretext for a quiet agreement between T-Mobile and Tesla for Tesla to use the “T-Mobile / Starlink spectrum” terrestrially, almost exclusively by Tesla. All major Tesla devices - vehicles, Powerwalls, [Superchargers](#), [Megachargers](#), [Megapacks](#), and perhaps even the mundane [Wall](#)

[Connector](#) all require Internet connectivity to be remotely managed. It's *completely* within the Tesla playbook to figure out how to vertically integrate. One thing that, to date, has been beyond Tesla's control is wide area wireless Internet connectivity. I predict that by end of 2023, *all* Tesla devices using cellular (or wired) connectivity will have converted over to this portion of T-Mobile spectrum or Starlink... with virtually no cost to Tesla. The stationary devices such as Superchargers, Megachargers, and especially Megapacks will all migrate their primary communications to (conventional) Starlink. I think it's feasible that Starlink will begin to embed T-Mobile picocells in its Starlink indoor units.

Putting T-Mobile's spectrum on Starlink satellites will be a difficult challenge. In addition to negotiating gnarly regulatory issues, Starlink will be adding large (25 square meters) antennas and additional radios to Starlink's "Gen 2" satellites... which will require the [SpaceX Starship](#) rocket (not yet operational) to get the [much larger Gen 2 Starlink satellites](#) into orbit.

But, in researching this subject... I was blown away that the T-Mobile / Starlink "technology partnership" *is actually on the trailing edge* of this technology trend! Two companies - [AST SpaceMobile](#) and [Lynk Global](#) are already attempting the same thing, and are (conceptually) way ahead of T-Mobile / Starlink, including satellites already in the manufacturing pipeline.

But, most surprising to me was the discovery that it's likely that Apple will debut the capability to communicate via Globalstar satellites in its *next iPhone*, and the announcement of this capability may come as soon as its [next public event on 2022-09-07](#).

Apple has apparently been working towards this capability for two or three years. Tim Farrar of TMF Associates, lays out the details in a [series of Tweets](#). Basically, Apple will pay Globalstar to allow iPhone users (using 2022-09 and later iPhones) to transmit and receive text messages via Globalstar, worldwide... *free*... completely bypassing cellular carriers. While only 2022-09 and later iPhones will be able to access the Globalstar satellites, all iPhone users will likely benefit from this improvement. It's nearly certain that Apple will integrate the Globalstar satellite capability seamlessly into iMessage so that if one user is using iMessage via cellular or Wi-Fi, and another is on Globalstar, it seems likely that Apple will have gateways in place to make it all "just work".

For now, this new service from Apple seems limited to text messaging, but it seems likely to me that the Apple / Globalstar partnership will expand. The biggest win for Apple is that Globalstar, in addition to its existing satellites and infrastructure, also owns two very valuable portions of spectrum, worldwide:

- 2.4835 - 2.495 GHz (downlink)
- 1.610 - 1.61872 GHz (uplink)

Let that sink in a bit. What could Apple... with its vast resources... *do* with this dedicated spectrum (available worldwide)? Apple could simply take full title to this spectrum by the simple purchase of Globalstar and realize Steve Jobs' [dream of an Apple wireless network for the iPhone](#).

We live in interesting times!

It's a bit early to announce details, but these developments have accelerated my plans for a new paid subscription newsletter that will focus on bleeding edge wireless technologies such as this. Look for that new newsletter later in 2022.

Surrey Amateur Radio Club's Communicator "Newsletter"

*They call it a newsletter. At 134 pages of compelling content... I call it a *magazine*!*

I have tried to make the point... quietly at times to selected individuals, and publicly here in Zero Retries, that the Amateur Radio Publishing Industrial Complex is "[walking dead](#)". That is, in the 2020s and beyond, expecting subscription payment for access to content about Amateur Radio (other than books) is a outmoded paradigm from the 20th century (now 22 years in the rear view mirror). Magazines / paid newsletters, etc. might continue to be relevant in other fields, but if Amateur Radio hopes to continue to be perceived as relevant... it's going to have to "adapt to the times" and embrace the "open content" model.

People of the current, and future generations, *expect* to be able to browse and find relevant information. If such information exists, but is sequestered behind a paywall (such as ARRL publications, CQ, and other publications), that content is defacto irrelevant and not worthy of notice. *Paying \$50 annually for a subscription to ARRL periodical publications? At best, that's a quaint notion - "People used to pay for that?"*.

I readily concede that Zero Retries, many blogs (especially those that I admire and follow), YouTube channels, podcasts, other newsletters, etc. are not "competition" for QST or CQ. However, Surrey Amateur Radio Club's [The Communicator - September-October 2022](#) "newsletter" *is* such competition. It's *free*, it's *available electronically to everyone*, it's *well-written*, and most importantly, it's *interesting*! It's... just... amazing. One of my primary complaints about the publications of the Amateur Radio Publishing Industrial Complex is that they just don't feature enough Zero Retries Interesting content. That is *not* a problem with The Communicator.

The readability, the overall style, the savvy use of graphics and photos, and just the overall tone makes The Communicator compelling reading. I'm in awe of John Schouten VE7TI's publishing chops. His capabilities make Zero Retires look like a threadbare rag in comparison. With The Communicator to set the bar for free Amateur Radio publications, I'm going to have to up my game with Zero Retries.

ZR > BEACON

- [The Random Wire Newsletter](#) - Tom Salzer KJ7T (a fellow Western Washingtonian) pinged me this week about *his* new Substack newsletter. Quite apart from the "us Amateur Radio Substack authors should support each other" factor, I enjoyed catching up with the previous issues of Random Wire, especially [The dearth of remotely controlled VHF/UHF radios](#). I've written a bit about this subject, and I shared some info via the comments about the [venerable Kenwood TM-V71A](#). While KJ7T disclaimed that Random Wire is "not nearly as technical and deep as yours!"... I'll disclaim in return that

Zero Retries is not nearly as “[them that’s doin’](#)” as Random Wire is. I really have to spend less time at the keyboard and more time at the workbench and the radio desk.

Zero Retries Sponsorships

The Zero Retries sponsorship model is *evolving*, but it’s initially inspired by the [Daring Fireball blog’s sponsorship model](#) (other than this sponsorship cost). Some initial points:

Sponsorship of Zero Retries is only available to “Zero Retries Interesting” companies, organizations, individuals, and projects. Ideally, a Zero Retries sponsor is involved in Amateur Radio, but that’s not an absolute requirement. If an individual or company would like to sponsor Zero Retries, but prefer to remain anonymous, that’s acceptable, but the “Zero Retries Interesting” criteria still apply.

- Sponsorships are limited to a *brief* mention in Zero Retries - a few sentences at most (but prominently displayed). Example - “WhizzyPacket is proud to sponsor this week’s Zero Retries”. More targeted sponsorship messages are acceptable, such as “WhizzyPacket is looking for a few good engineers - click here”.
- A sponsorship is for *one* weekly issue of Zero Retries and is exclusive - one sponsor per week. Sequential sponsorships are available - as much as three months of sponsorship is acceptable. Longer than three months, let’s discuss it.
- Lastly, although it kind of defeats the overt purpose of sponsorship, if a *Zero Retries Interesting company, organization, individual, or project cannot afford to pay for a sponsorship*, but wants / needs to “get the word out”, Zero Retries can probably work something out. In fact, if there are gaps in sponsorships, I’ll probably create some gratis sponsorship messages.

If you are interested in sponsoring Zero Retries, please reach out - it’s early days. More importantly, if you know of a company, organization, project, or individual that you think could / would / should sponsor Zero Retries, *please point out Zero Retries to that entity*.

Zero Retries Poll - Subject

Zero Retries 0062 poll:

If you're in the Western Hemisphere, would you use a geostationary Amateur Radio payload (like QO-100)? 26 votes were cast.

Yes, that sounds interesting. 71%

No, I have no interest in GEO sats. 29%

Join the *Fun* on Amateur Radio

If you’re not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything*!
- Pseudostaffer [Dan Romanchik KB6NU](#) for continuing to spot, and write about “Zero Retries Interesting” items on his blog that I don’t spot on my own.
- [Amateur Radio Weekly](#) and [Southgate Amateur Radio News](#) consistently surface “Zero Retries Interesting” stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

If you’re reading this issue on the web and you’d like to see Zero Retries in your email Inbox every Friday afternoon, just click:

Subscribe now

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Please tell your friends and co-conspirators about Zero Retries - just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy; yes, you guessed it... just click:

Leave a comment

Email issues of Zero Retries are “instrumented” by [Substack](#) to gather basic statistics about opens, clicking links, etc. I don’t use such information in any way other than seeing that most subscribers actually do read Zero Retries.

More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted in beautiful Bellingham, Washington, USA

2022-09-02

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1

stevestroh@gmail.com

2

<https://www.iridium.com/network/>

3

<https://firstnet.gov/network>

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<https://www.starlink.com/rv>

5

https://en.wikipedia.org/wiki/High_frequency

6

https://en.wikipedia.org/wiki/Maker_culture

7

https://en.wikipedia.org/wiki/Hacker_culture

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